You Are Here: Green Design Principles in Foundational Architectural Curricula

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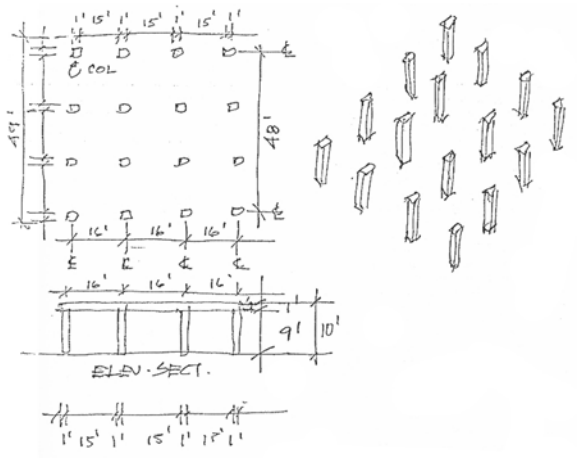
Introduction

Ideally, green design incorporates both the ethic of sustainability and ecological literacy as integral to the design process rather than as additive to it. In practice, this type of integral design requires complex understandings of and a facility with various technical, spatial, and natural systems. In order to imbed these complex abilities within the design process, it is first necessary to incorporate their basic principles within foundational curricula. Conversely, introducing the concepts later, either solely in technology courses or in a specialized "sustainability studio", only serves to reinforce the additive notion that green design somehow stands apart from design proper.

Influence of the Texas Rangers

Beginning design in much of North America is widely influenced by the Texas/Cornell/Cooper Union tradition first developed by Hoesli, Rowe, Hedjuk, Slutzky and others in the mid 1950's. With a strong emphasis on abstract spatial composition as the foundation upon which students' architectural design abilities are based, the method has been enormously successful. The resulting self-referential, somewhat valueless compositions typified by the nine square grid exercise and its descendants provide open armatures ready to receive successive layers of design complexity and technical information as students' educations progress.



John Hedjuk's nine-square grid exercise from *Mask of Medusa*

While it was not the intent of the Texas Rangers to educate designers for an abstract world disconnected from notions of place, within their method the specifics of program and site (and to some extent even materials) were seen as clearly secondary to formal composition. While for Hedjuk the nine-square grid exercise embodied the fundamentals of detailing and construction albeit on a conceptual level, for Slutzky it was "metaphysical" and "unending in its voidness."[1] In his notebooks from the period Hoesli calls the use of the building, the contents of the building, and

site and climate, "modifying and conditioning influences" clearly suggesting that these concerns shape a formal design that precedes them rather than being integral to its creation.[2]

In many ways it is the nearly completely abstract nature of these early exercises that sets up the rift between "pure" design and environmental response - a rift that by the time it is carried to its logical conclusion in practice results in "tacked on" attempts at green design - solar panels and green roofs on a building that has fundamental orientation, insulation, and ventilation problems. While the pedagogy that has been inherited from the Texas tradition is too valuable and too effective to discard, at a time when the environmental, societal, and even moral importance of architects' and designers' decisions is clear it is time to ground the purity of the cube in the realities of a place.

Here

At the University of Tennessee, where I teach, foundation studios employ a typical series of abstract exercises that progressively introduce students to issues of figure/ground, formal ordering systems, depth and transparency, gradually progressing to the interplay of spatial frames and planes in three dimensions and culminating in a simple pavilion based on the interplay of cubic forms that introduces the concepts of scale, topography, and inhabitation. This final exercise is not completely siteless. The brief states that it is on a south facing slope in the northern hemisphere looking over a lake in the foreground and mountains in the distance. Yet, I would argue that a much more specific locating of this project on a nearby site of similar features would provide multiple opportunities to engage students on a wide range of issues fundamental to their development as adept green designers.

Pavilion, first year design project, Curtis Jennings

You are here. You are on Poor Valley Ridge in upper East Tennessee, a few narrow ridges and valleys over from the eastern escarpment of the Cumberland Plateau. You are in this distinctive rippling landscape pushed up (most likely) when Africa collided with North America 250 million years ago.[3] You are here looking down to the south southeast over Cherokee Lake, formed in 1941 when the Tennessee Valley Authority (TVA) completed Cherokee Dam on the Holston River - the upper reaches of one of the largest public works projects in the history of the world. Two days after the dam's completion Japanese planes bombed Pearl Harbor. You are here looking down on the suburban developments of Grainger County that dot the lake's shoreline. This was once all farmland and the patterns of those much larger holdings are still evident, providing an organizing framework for the smaller lots now within them. Across the lake is Hamblen County, Morristown

lies a few miles beyond the lakeshore. If you were here at night, the town would create a glow in the middle distance obliterating much of the night sky. Just over 50 miles downstream from the dam (which is to the southwest and beyond your view) the meandering Holston joins the French Broad to form the Tennessee River just above Knoxville. You are here in a forest of mostly hardwoods - maple, oak, poplar. Their raspy leaves litter the ground under your feet and crackle as you walk. It is 2:00 PM on October 18. As you look down the ridge to the southwest the sun is almost equidistant between the horizon and the top of the sky and is nearly aligned with the landform as it stretches into the distance. With the assistance of the sun's warmth, it is a comfortable 65 degrees, though a slight breeze touches your face, directed as it is by the hollow of the Great Valley of East Tennessee beyond. *36°19' N, 83°7' W, 1541 ft.*

Cherokee Lake - *36°19' N, 83°7' W, 1541 ft*
photograph by the author

Through the experience of a landscape with which they are either already familiar or with which they can engage directly, beginning students are offered the chance to first consider issues such as orientation, solar response, climatic response, material flows, and human comfort in terms that are not technical but rather are visceral with the possibility of becoming poetic. These poetic potentials afford the possibility that environmental concerns might become an integral part of a student's design method - prime concerns to which formal composition might be addressed.

The simple device of a sundial placed on a study model provides opportunity to learn - not about azimuth and altitude - but about how THIS shelter in THIS place is immersed in the solar environment in a particular way. This immersion in turn yields specific human experience as shaped by the student's formal composition. As one tilts the model to register a summer day does the design provide an adequately shaded area for gathering? The student remembers how the hot humid weather caused sweat to run down her forehead and under her sunglasses during the site visit several weeks ago. She recalls the relief offered by a shade tree. As the model is tilted to simulate a winter day do the sun's rays penetrate deep into the lower level warming the retaining wall at the rear? She thinks of the nip in the air as she walked to class this morning. Can she mobilize what she has learned of formal composition to make this a pavilion that is more closely attuned to East Tennessee? Can she use her architecture to facilitate and heighten human experience in this place? Such a close connection between design process and basic environmental concerns surely requires that design be tied to place very early in the development

of design abilities - for the beginning design student it seems that the appropriate place for this grounding is their place.

This grounding also provides opportunity to begin discussion about local materials - a discussion that is overtly about their evocative natures: their colors, textures, and relationship to the surrounding landscape. However, along with these questions come at least two subtexts. The first involves the raw materials of the place and what W.G. Clark has called "atonement" - the fact that in order to construct in this place one must first destruct a part of it, removing trees, reshaping the land.[4] By Clark's reasoning all architecture must at minimum atone for this material loss. The second subtext involves the entire process of material flows in the modern construction industry. If the student introduces the use of stone in her project depending on her objectives we might suggest she consider either the variegated warmth of Crab Orchard stone from just the other side of Knoxville or the cool solidity of East Tennessee marble. If the frame of the pavilion becomes timber, those same hardwoods found on the slope of the site offer the possibility of an environmentally benign source that also bears the poetic strength of being connected to place.

There

Once we have established this connection to and understanding of one's own place, history courses and precedent analyses begin to expand students' horizons and point toward other places. Careful consideration of how these projects respond to their places environmentally, formally, and materially is an opportunity to teach through inference and implication how fundamental response to one's surroundings might change as place varies. The vast majority of examples from architectural history (any project that is pre-industrial) are buildings that responded to their place through sophisticated passive means and most likely participated in the local material culture.

You are here. You are on the outskirts of Scottsdale, Arizona raised slightly above the dun colored floor of the Sonoran desert that falls away before you dotted with cacti, mesquite trees, creosote bushes, and soaptree yucca. The foothills of the McDowell Mountains rise to your back against a brilliantly blue and very wide sky. You are standing in the sunken garden of Taliesin West just off of the main studio. Wright's deep overhangs provide a welcomed refuge from the sun. The large stones incorporated into the "desert concrete" that make up the lower walls recall the nearby surroundings in testament to their origins.[5] The pool of water in the courtyard proves a cooling influence for this outdoor room, a strategy that has little effect in humid Tennessee. Again it is 2:00 PM on October 18. The position of the sun is nearly the same as on the afternoon on Poor Valley Ridge. Yet, the temperature is 85 degrees and the day is threatening to add a few degrees more before is begins dipping toward nighttime. A faint dry wind blows almost directly out of the west. As you look to the southwest the Phoenix megaplex stretches out like a carpet along the desert floor in front of you until it bumps up against the mountains in the far distance. You turn and walk back under the low slung roof into the cool interior. *33°36' N, 111°51' W, 1602 ft.*

Taliesin West - *36°19' N, 83°7' W, 1541 ft*
photograph by Pedro Guerrero

Conclusion: Expanding Here

As we glance forward in the curriculum, might we then begin to consider how this experiential relationship to place could provide the introduction of the more technical information to follow? Might courses in environmental controls begin conceptually with Banham's metaphoric tent and campfire as the two methods by which humans have traditionally modified their environments - one through the manipulation of fabric, one through the delivery of energy?[6] Might we also understand the historical preference for one or the other of these options to be dependent largely the relationship of local peoples to their own places and the resources that place offered? Are materials and methods courses best prefaced by Frampton's thoughts on the tectonic and stereotomic?[7] If so, can these modes of construction be considered as traditionally having a strong relationship to the climate and available materials in a given place rather than solely as a preference for one form of expression over another?

As many schools adopt the 2010 Imperative, the question of how to incorporate green design principles in foundational curricula is arising with regularity. This paper proposes a model for doing so using the experience of place as an organizing framework - beginning by grounding students in their own place (here) then developing their understandings of other places (there). This model posits that introducing fundamental issues of green design through experiential rather than technical means might allow consideration of the environment to become imbedded in the process of design as a source of richness and poetics. As James Marston Fitch stated, "the successful interposition between people and their natural environment furnishes the material basis of all great architecture. To wrest the objective conditions for our optimal development and well-being from a Nature that only seldom provides them, to satisfy our physiological and psychological requirements at optimal levels - this, beyond question, is the objective basis of any architecture that is both beautiful and good."[8]

Finally then this model might also be extended into upper level courses simply by incrementally asking students to assume responsibility for a wider and wider portion of the physical realm finally expanding the notion of "here" to encompass the entire planet.

You are here. You are on Buckminster Fuller's Spaceship Earth. You are on Carl Sagan's Pale Blue Dot. You are on the third planet from the sun at the edge of a spiral galaxy the milky disc of which streaks across our shared night sky. The night sky that the ancestors of all cultures looked up at and were moved to create stories that explained who they were. You are here where the blue sky of day has become the shared banner of the United Nations. You are here and this is your heritage. This is your responsibility. This is both your canvas and your medium. Any latitude, any longitude, any elevation.

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[1] Alexander Caragonne, *The Texas Rangers: Notes from an Architectural Underground* (Cambridge : MIT Press, 1995), p. 195.
[2] Caragonne, p. 200.
[3] Edward T. Luther, *Our Restless Earth: the Geologic Regions of Tennessee* (Knoxville : University of Tennessee Press, 1977), p. 67.
[4] Richard Jensen, *Clark and Menefee* (New York : Princeton Architectural Press, 2000), p. 10.
[5] James H. Charleton, National Register of Historic Places Inventory Nomination Form, http://pdfhost.focus.nps.gov/docs/NHLS/Text/74000457.pdf , (accessed 25 May 2008), p. 2.
[6] Reyner Banham, *The Architecture of the Well Tempered Environment, Second Edition*, (Chicago, University of Chicago Press, 1984), pp. 18-21.
[7] Kenneth Frampton and John Cava (ed.), *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge: MIT Press, 1995) pp. 1-27.
[8] James Marston Fitch and William Bobenhausen, *American Building: the Environmental Forces that Shape it* (New York: Oxford University Press, 1999), p. 3.